Attachment 13

Stormwater Flood Management Grant Proposal
City of Redwood City
Stormwater Resources Plan

Attachment 13 consists of the following items:

- ✓ **Summary of Consistency with Stormwater Resources Plan Requirements.** Attachment 13 contains detailed information that demonstrates how various Redwood City planning documents meet all of the standards of the Stormwater Resources Plan.

This attachment summarizes portions of various Redwood City (City) planning documents that meet the requirements of the Stormwater Resources Plan set forth within Part 2.3 (commencing with Section 10560) of Division 6 of the California Water Code (CWC).

The City of Redwood City is a member agency of the City/County Association of Governments of San Mateo County (C/CAG), who produced a Stormwater Management Plan in 2003. The contents of this plan adhere to the Stormwater Resources Plan (SWRP) requirements set forth within the CWC statutes listed above. In addition to the C/CAG Stormwater Management Plan, Redwood City as a separate entity and Redwood City as part of the San Mateo Countywide Stormwater Pollution Prevention Program (STOPPP) has produced several planning documents, programs, ordinances, and other measures that provide functional equivalency to the SWRP requirements. Table 13.1 provides a summary of conformance with respect to all of the aforementioned stormwater resources components, which together are functionally equivalent to a SWRP.

Table 13.1: Summary of Stormwater Resources Plan Conformance

#	Stormwater Resources Plan Requirements	Functionally Equivalent Redwood City Documents	Specific Citation(s)
1	Opportunities to augment local water supply through groundwater recharge or storage for beneficial reuse of stormwater.	San Mateo Countywide Water Pollution Prevention Program – Stormwater Management Plan	• New Development Objectives, page 5-2
		San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook	• Executive Statement, page i • Project Summary, page 7 • Introduction, pages 9 and 10 • Volume Reduction Goal, page 11 • Site Layout Strategy, pages 28 and 29
		C.3 Stormwater Technical Guidance	• Post-Construction Stormwater Control Measures, Stormwater Treatment, Chapter 2, page 8 • Upcoming C.3. Requirements, Chapter 2, page 12 • Infiltration Guidelines, Chapter 5, page 56
		City of Redwood City Code of Ordinances	• Green Building Code – Chapter 9, Article X • Stormwater Management and Discharge Control Program – Chapter 27A, Article I and II
2	Opportunities for source control for pollution and stormwater runoff volume, onsite and local infiltration, and reuse of stormwater.	San Mateo Countywide Water Pollution Prevention Program – Stormwater Management Plan	• BMPs and Implementation Procedures for Conditionally Exempted Discharges, Landscape Irrigation, page E-3
		San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook	• Executive Statement, page i • Project Summary, page 7 • Introduction, pages 9 and 10 • Volume Reduction Goal, page 11 • Site Layout Strategy, pages 28 and 29

#	Stormwater Resources Plan Requirements	Functionally Equivalent Redwood City Documents	Specific Citation(s)
		C.3 Stormwater Technical Guidance	• Post-Construction Stormwater Control Measures, Stormwater Treatment, Chapter 2, page 8 • Section 2.2.2 Source Control Measures, Chapter 2, page 7. • Infiltration Guidelines, Chapter 5, page 56
		City of Redwood City Code of Ordinances	• Green Building Code – Chapter 9, Article X • Stormwater Management and Discharge Control Program – Chapter 27A, Article I and II
3	Projects to re-establish natural water drainage treatment and infiltration systems, or mimic natural system functions to the maximum extent feasible.	San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook	• Project Summary, page 7 • Introduction, pages 9 and 10 • Site Layout Strategy, pages 28 and 29
		Redwood City Plan: Comments, Cooperation and Conservation on the Bair Island National Wildlife Refuge	• Objective, page 3 • Conservation, Cooperation, Communication, and Collaboration, page 8
4	Opportunities to develop or enhance habitat and open space through stormwater management, including wetlands, riverside habitats, parkways, and parks.	San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook	• Project Summary, page 7 • Introduction, pages 9 and 10 • Site Layout Strategy, pages 28 and 29
		Redwood City Plan: Comments, Cooperation and Conservation on the Bair Island National Wildlife Refuge	• Objective, page 3 • Conservation, Cooperation, Communication, and Collaboration, page 8
5	Design criteria and best management practices to prevent stormwater pollution and increase effective stormwater management for new and upgraded infrastructure and residential, commercial, industrial, and public development. These design criteria and best management practices shall accomplish all of the following:	San Mateo Countywide Water Pollution Prevention Program – Stormwater Management Plan	• BMPs and Implementation Procedures for Conditionally Exempted Discharges, Landscape Irrigation, page E-3
5(a)	Reduce effective impermeability within a watershed by creating permeable surfaces and directing stormwater to permeable surfaces, retention basins, cisterns, and other storage for beneficial reuse	City of Redwood City Stormwater Pollution Prevention Program	• Design Guidelines for Permeable Pavements
5(b)	Increase water storage for beneficial use through a variety of on-site storage techniques.	See details above.	Refer to the citations and references set forth within section 1 of this table.

#	Stormwater Resources Plan Requirements	Functionally Equivalent Redwood City Documents	Specific Citation(s)
5(c)	Increase groundwater supplies through infiltration, where appropriate and feasible.	See details above.	Refer to the citations and references set forth within section 1 of this table.
5(d)	Support low-impact development for new and upgraded infrastructure and development using low-impact techniques.	Developments Protecting Water Quality – A Guidebook of Low Impact Development Examples	• Throughout. Particularly, Background, page I-1
6	Activities that generate or contribute to the pollution of stormwater, or that impair the effective beneficial use of stormwater.	San Mateo Countywide Water Pollution Prevention Program – Stormwater Management Plan	• Projects with Significant Stormwater Pollution Potential, Attachment A-1
		City of Redwood City Pollution Prevention Program	• Source Control Measures List
7	Projects and programs to ensure the effective implementation of the stormwater resource plan pursuant to this part and achieve multiple benefits.	Please refer to all of the aforementioned documents, which are projects and programs that ensure the effective implementation of a functionally equivalent stormwater resource plan for the City of Redwood City.	N/A
8	Ordinances or other mechanisms necessary to ensure the effective implementation of the stormwater resource plan pursuant to this part.	Redwood City Zoning Ordinance	• Zoning Ordinance Article 32, Supplementary Provisions, Section 32.12 Stormwater Treatment
		San Mateo Countywide Stormwater Pollution Prevention Program (STOPPP): Stormwater Management Plan	• Redwood City, as a member agency of C/CAG, is included within the adopted San Mateo Countywide STOPP Stormwater Management Plan.

Plan Excerpts that Demonstrate Functional Equivalency

City/County Association of Governments Stormwater Management Plan

As a member of the City/County Association of Governments of San Mateo County and through their association with the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), the City of Redwood City is a participating agency for the San Mateo Countywide Stormwater Pollution Prevention Program (STOPPP) Stormwater Management Plan that was produced in 2004. The following contains a detailed list of excerpts from this planning document that demonstrate functional equivalency to stormwater resources plan requirements established within the CWC (C/CAG 2003).

Executive Summary (page ES-1): "This Stormwater Management Plan (Plan) describes what STOPPP will be doing during the approximately six-year period from April 2004 through June 2010 to prevent and control stormwater pollution in San Mateo County…The Plan, in conjunction with the reissued permit (National Pollutant Elimination Discharge System Permit) adopted by the Regional Board, is designed to enable STOPPP to meet these (stormwater control and water quality) requirements."

BMPs and Implementation Procedures for Conditionally Exempted Discharges, Landscape Irrigation (page E-3): "Irrigation systems can avoid runoff by matching water application rates to infiltration rates. Systems must avoid overspray onto impervious surfaces…Avoid over irrigation that causes erosion…Any pesticide application should be done at the optimal time to maximize its effectiveness and minimize the possibility of discharging pesticides with landscape irrigation or stormwater runoff."

New Development Objectives (page 5-2): "The primary goal of the New Development and Construction Controls section of the Plan is to minimize the water quality and beneficial use impacts of land development, both during and after construction. Beneficial use is defined as those uses allowing the highest water quality consistent with the maximum benefit to the people of California, including uses for recreation, preservation and enhancement of fish and wildlife use, agricultural supply, industrial service and process supply, municipal and domestic supply, groundwater recharge, navigation, and ocean commercial and sport fishing."

Projects with Significant Stormwater Pollution Potential (Appendix A-1): "A project which causes substantial or potentially substantial adverse change in the quantity and/or quality of stormwater runoff generated from the site. (Note: This is consistent with the CEQA definition of significance. Professional judgment will be required in evaluation of project impacts, until specific thresholds for significance have been adopted.) Projects will be considered to have significant stormwater pollution potential if the project site contains or is adjacent to a "sensitive area" (see definition below) and/or the project disturbs sufficient area to require coverage under the State Water Resources Control Board (SWRCB) NPDES General Permit for Stormwater Discharges Associated with Construction Activity (construction General Permit) or the NPDES General Permit for Stormwater Discharges from Small Linear/Underground/Overhead Projects (small LUP General Permit)."

Appendix B, Performance Standards (B-ii through B-iii): "STOPPP developed these baseline performance standards as a tool to help STOPPP member agencies comply with their NPDES permit…The Performance Standards provide an effective, consistent, and predictable countyswide approach to minimizing water quality impacts."

Appendix F, Pollutant Prevention and Control Measures Plan: "STOPPP's strategy to address all of the pollutants of concern includes providing funding and program representation to regional collaborative efforts…In addition, STOPPP will prepare a new plan for controlling specific pollutants of concern and begin implementing the new plan in fiscal year (FY) 2005/2006).

San Mateo Countywide Water Pollution Prevention Program

The City is part of this program, which has led to the adoption of many guidelines and activities that aim to create public-private partnerships that provide design criteria and BMPs to decrease stormwater runoff and associated pollutants, and utilize stormwater for beneficial reuse purposes. The specific programs designated under SMCWPPP are discussed in detail below. More information on this program, including the program mission of "partnering with residents and businesses to prevent pollution of local water bodies" can be found at http://www.flowstobay.org/

San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, 2009

This guidebook was created as part of the SMCWPPP, and provides information on creating low-impact development roadways and parking lots within San Mateo County in order to manage stormwater (Nevue Ngan Associates and Sherwood Design Engineers 2009). The following are excerpts from the guidebook, which specifically address SWRP requirements listed within the CWC.

Executive Statement (page i): "Small amounts of rain throughout a watershed incrementally add up to large volumes of water downstream. Similarly, small changes to stormwater runoff treatment in a watershed can cumulatively result in significant improvements to overall watershed health. For this reason, the site-scale stormwater management strategies described in the guidebook are at the core of creating balanced watershed systems.

The guidebook encourages the use of low-impact development for new and retrofitted road and parking lot projects. Supporting use of low-impact development for stormwater management is an objective shared by the C/CAG, local communities, and the San Francisco Bay Regional Water Quality Control Board/State Water Resources Control Board, which has adopted low-impact development as one of its core values."

Project Summary (page 7): "Sustainable stormwater design treats rainfall runoff as a valuable resource. It is based on balancing urban development while preserving natural hydrologic functions. Furthermore, sustainable stormwater design achieves the multiple goals of being cost effective, improving water

quality, and addressing community concerns. Mimicking the natural hydrologic function of health ecosystems in street and parking lot landscapes can dramatically reduce pollution, decrease runoff volume, reduce runoff temperature, protect aquatic habitat, and create more interesting places to live."

Introduction (pages 9 and 10): "When the natural landscape is urbanized, impervious surface is created that prevents water from being absorbed at the source. Sediments and pollutants from streets, parking lots, homes, yards, and other sources are washed into pipes and water bodies…The high volume and velocity of stormwater runoff emptying into creeks and streams may cause flooding and erosion, destroying natural habitat. There is a better approach."

"Infrastructure can be designed to minimize its impact on natural drainage systems. Our infrastructure can help maintain the balance of natural drainage systems by capturing, slowing, and absorbing stormwater, as well as filtering the pollutants that urban development introduces."

Volume Reduction Goal (page 11): "Whenever possible, facilities should collect and absorb stormwater to reduce the overall volume of runoff. Retention facilities offer long-term stormwater collection and storage for reuse or groundwater recharge."

Site Layout Strategy (page 28): "The very notion of green streets and green parking lots is to incorporate as much green space as possible in order to better manage stormwater runoff."

Site Layout Strategy (page 29): "Designing a network of small stormwater surface conveyance features can be done for new development and retrofit projects. Traditional landscape areas can be transformed into naturalized stormwater conveyance systems simply by depressing greenspace into the existing landscape. Larger stormwater facilities can be interconnected with swales, runnels, trench trains, and other surface conveyance systems. Having this conveyance network reduces peak flows and volumes, recharges groundwater aquifers, and provides water quality treatment."

C.3 Stormwater Technical Guidance, Version 2

This document is a handbook that was created to assist developers, builders, and project sponsors in technical design of post-construction stormwater controls to reduce pollutants and control stormwater flows from new developments in order to comply with local municipal requirements (C.3 requirements) aimed at reducing long term impacts of development on stormwater quality and creek channels (SMCWPPP 2007). The following are excerpts from the handbook, which specifically address stormwater issues outlined within the CWC:

Post-Construction Stormwater Control Measures, Stormwater Treatment (Chapter 2, page 8): "Beginning December 1, 2011, the Municipal Regional Stormwater Permit (MRP) will require stormwater treatment requirements to be met by using evapotranspiration, infiltration, rainwater harvesting and reuse. Where this is infeasible, landscape-based biotreatment will be allowed. In some special projects, media filters may be allowed."

Section 2.2.2 Source Control Measures (Chapter 2, page 7): "Source control measures consist of either structural project features or operational 'good housekeeping' practices that ***prevent pollutant discharge and runoff*** at the source, such as by keeping pollutants from coming into contact with stormwater."

Upcoming C.3. Requirements (Chapter 2, page 12): "Beginning December 1, 2012, all projects which create and/or replace 2,500 sq. ft. to 10,000 sq. ft., including detached single-family residences that are not part of a larger plan of development, must implement one or more of the following:

- Direct roof runoff into cisterns or rain barrels for reuse.
- Direct roof runoff onto vegetated areas.
- Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas.
- Direct runoff from driveways and/or uncovered parking lots onto vegetated areas.
- Construct sidewalks, walkways, and/or patios with permeable surfaces.
- Construct bike lanes, driveways, and/or uncovered parking lots with permeable surfaces."

Infiltration Guidelines (Chapter 5, page 56): "Infiltration can be a very cost-effective method to manage stormwater – if the conditions on your site allow. A wide-range of site-design measures and stormwater treatment measures can be used to increase stormwater infiltration and can be categorized as follows:

- Site design measures -- such as clustering development or otherwise laying out the site to reduce impervious area, routing drainage from building roofs to landscaped areas, and using pervious pavement.
- Indirect infiltration methods, which allow stormwater runoff to percolate into surface soils. Runoff may reach groundwater indirectly, or it may be underdrained into subsurface pipes. Examples of indirect infiltration methods include bioretention areas and vegetated swales.
- Direct infiltration methods, which are designed to bypass surface soils and transmit runoff directly to subsurface soils for groundwater recharge. These types of devices must be located and designed to limit the potential for stormwater pollutants to reach groundwater. Examples of direct infiltration methods include infiltration trenches and dry wells.

Developments Protecting Water Quality – A Guidebook of Low Impact Development Examples

This guidebook was designed by SMCWPPP in 2009 for the sole purpose of supporting low impact development in San Mateo County. The Background section of this plan states that the guidebook was created, "as part of the effort to encourage the use of low impact development (LID) site design measures that benefit water quality. It is intended to serve as a reference during the conceptual design and review stage and to be used by both project applicants and municipal staff. This document provides examples of innovative LID designs in San Mateo County."

City of Redwood City Pollution Prevention Program

Through the City's Pollution Prevention Program, there have been multiple planning documents, design guidelines, booklets, and other resources available to support developers and other entities in reducing stormwater runoff and reducing impacts associated with said runoff. These resources include the *Design Guidelines for Permeable Pavements, Drainage Guidelines for Residential Development,* and the *Local Source Control Measures List.* Each of these documents is described in further detail below.

Design Guidelines for Permeable Pavements

This document contains guidelines for residential development to increase and improve impermeability by establishing goals and regulations for permeable pavements. According to this document, "permeable pavements reduce impervious land coverage while simultaneously providing a stable load-bearing surface. While forming a surface suitable for walking and driving, permeable pavements also contain sufficient void space to infiltrate runoff into soil. By making pavements permeable, impervious surface coverage can be reduced without sacrificing intensity of use (City of Redwood City n.d.(b)).

Drainage Guidelines for Residential Development

This document contains guidelines for residential development to increase and improve drainage to reduce stormwater pollution. The stated goal of this document is "to maintain post-development stormwater runoff to pre-development runoff conditions, especially when existing drainage flows onto neighboring properties (City of Redwood City 2004).

Source Control Measures List

This document contains a list of common sources of stormwater pollution, and also contains guidelines that can be used to reduce stormwater pollution from identified sources. This document specifically addresses source pollution related to landscaping and irrigation design, storm drain inlets and waterways, parking facilities, pool, spa, and foundation discharges, food service facilities, refuse areas, outdoor process activities, outdoor storage activities, outdoor vehicle cleaning facilities, vehicle/equipment repair and maintenance, fuel dispensing areas, loading docks, miscellaneous drain or wash water, and marinas and boating facilities (City of Redwood City 2005).

City of Redwood City Code of Ordinances

The City's Code of Ordinances demonstrates a commitment to addressing many stormwater issues, including pollution, beneficial reuse, and other provisions for stormwater resources plans set forth within the CWC.

Chapter 9, Buildings, Article X, Green Building Code

One of the purposes of the Green Building Code is to "encourage the conservation of natural resources," which includes water. The Green Building Code specifies that new construction or additions of 1,000 square feet or more for a residential project shall not be granted unless various green building requirements are met. These building requirements include GreenPoint published by Build It Green, and Leadership in Energy and Environmental Design (LEED) standards. Both of these standards emphasize augmenting local water supply through groundwater recharge and storage for beneficial reuse of stormwater as is demonstrated by the following requirements:

- Build It Green: GreenPoint system provides points for the installation of green roofs and other stormwater management practices such as bio-swales and permeable paving (Build It Green 2005). These stormwater management practices help to augment local water supplies by reducing runoff and increasing infiltration, which increases groundwater recharge.
- LEED: The Sustainable Sites (SS) and Water Efficiency (WE) components of LEED evaluations gives specific credit for stormwater reuse and groundwater infiltration activities (USGBC 2005).
    - Points are given for SS Credit 6.1, Stormwater Design: Quantity Control for various stormwater activities, including reusing stormwater volumes generated for non-potable uses such as landscape irrigation, toilet and urinal flushing, and custodial uses (USGBC 2005).
    - Points are given for WE Credit 3.1 and 3.2, Water Use Reduction: 20% Reduction for various activities, including reusing stormwater and greywater for non-potable applications.

Chapter 27A, Stormwater Management and Discharge Control Program, Articles I and II

*The stated Purpose and Intent of this portion of the City's Ordinance is "*to protect the health, safety and general welfare of the people of Redwood City and the surrounding region from water quality degradation caused by stormwater run-off" (City of Redwood City n.d.(a)). This portion of the ordinance includes requirements for stormwater treatment measures that focus on detention/retention units or infiltration structures. The requirement and implementation of these measures demonstrate a commitment on behalf of the City to reduce runoff, increase infiltration, and therefore increase local groundwater recharge and reduce water pollution.

Zoning Ordnance, Article 32, Supplementary Provisions

Section 32.12 Stormwater Treatment: "The purpose of the requirements set forth in this section is to provide zoning standards that minimize the quantity of runoff and associated pollutants in stormwater runoff from developed sites to creeks, the stormdrain system, and ultimately, to the San Francisco Bay. Enhanced stormwater quality can be achieved through reduction of impervious surfaces, the protection of watercourses and riparian vegetation, providing for infiltration of stormwater on-site through vegetation and soils, and with engineered treatment systems."

Bair Island National Wildlife Refuge Plan

The City has worked with the United States Fish and Wildlife Service (FWS) to complete restoration activities on the Bair Island National Wildlife Refuge, and has specifically worked to restore conditions within this wildlife refuge to previous conditions to mimic natural system functions. Part of these efforts includes completion of an alternative restoration plan for the Bair Island National Wildlife Refuge titled, *Redwood City Plan: Comments, Cooperation, and Conservation on the Bair Island National Wildlife Refuge* (FPC and Huffman 2004). This planning document is an alternative to the proposed National

Wildlife Refuge System (NWRS) plan, because in addition to restoration efforts, it emphasizes opportunities to enhance open space and recreational opportunities for local residents.

The following contains excerpts from this planning document that demonstrate functional equivalency to the SWRP requirement set forth within the CWC.

- **Objective, page 3:** "To preserve and protect potentially the largest, urban wildlife refuge in the western United States…Redwood City sees a unique opportunity to forge a mutually beneficial partnership with the Refuge (NWRS) that will enhance and expand the restoration plan to benefit all stakeholders."
- **Conservation, Cooperation, Communication, and Collaboration, page 8:** "Restoration of Inner Bair Island will require the existing subsided soils to be filled and groomed before it can be used for habitat. Dredge spoils from Redwood Creek will be deposited on Inner Bair to bring the site above sea-level so that gentle inundation of soils, rather than lake pooling, feeds the habitat. Because of this, the City feels that an opportunity exists to work with the NWRS to design contours and elevations on Inner Bair Island with future public use in mind."

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